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# COLOR BREAKING IN PANSIES AND VIOLAS

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**If your pansies or violas have pale streaks on the petals**

they probably have one of the two virus diseases that are common in California gardens, nurseries, and seed farms.

Both are spread by aphids—and only in this way.

Plants may have been infected while still in flats in the nursery; or the disease may have developed in the garden on plants that were healthy when you bought them, or on plants grown from seed.

Once a plant is infected, you cannot cure either disease.

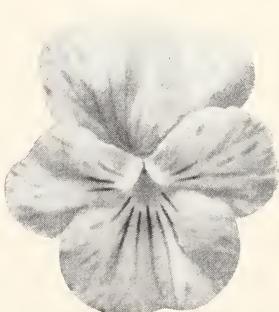
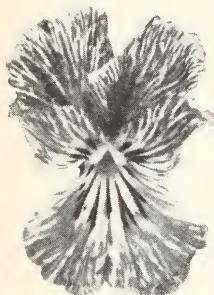
But you can prevent the disease or, if some of your plants already have it, you can keep it from spreading to other plants if you will:

*Avoid buying plants that show even early symptoms (see text) or have any aphids on them.*

*Spray plants thoroughly once a week with Black Leaf 40, to kill aphids (see back cover). Take care to spray the undersides of the leaves.*

*Pull out and destroy at once any plants that show symptoms.*

Fig. 1. COLOR BREAKING IN VIOLAS: *Top flower*, white streaks, Papilio variety; *Second flower*, white blotches, Heavenly Blue variety; *Third flower*, dwarfed and misshapen petals with white blotches, Radio variety; *Corner flower*, normal blossom, Radio variety; *Flower below*, color faded out except for short pale-blue streaks, Radio variety; *First leaf*, cleared veinlets; *Second leaf*, normal.



# COLOR BREAKING IN PANSIES AND VIOLAS

HENRY H. P. SEVERIN

COLOR BREAKING of pansies and violas (tufted pansies) is common in California gardens, nurseries, and seed farms. On infected plants, you will see white or light streaks or blotches on flower petals where there should be solid color. The flowers, especially violas, are often dwarfed and misshapen.

Two different viruses cause this trouble. They are called celery-calico virus and western-cucumber-mosaic virus, from their effects on other plants. Both are spread by aphids. Celery-calico virus is common in the coastal fog belt and also occurs in the hot interior regions. Western-cucumber-mosaic virus occurs only in the interior regions.

## WHAT YOU SEE

You cannot tell which virus is causing the trouble by their effects on pansy and viola. The viruses can only be told apart by the symptoms they cause on other host plants. For practical purposes, you do not need to find out which disease is present, because both are controlled the same way.



On flowers, the first color change you see is usually pale streaks of the normal color, such as violet streaks on purple petals; then these pale streaks gradually fade to white. Sometimes the streaks turn white even before the flower opens. Many flowers have pale or white blotches instead of streaks. You may see the streaks or blotches on all the petals, or only on the upper two or upper four. The whole flower may turn pale or even white, and such flowers are often dwarfed and misshapen. On variegated varieties, the markings may fade out. Usually you can see some symptoms on all the flowers that develop after a plant becomes infected. The pansies on the front and back covers show several types and stages of color breaking. These flowers are from Mastodon Jumbo plants infected with celery calico; flowers from other strains, or infected with the other virus, have similar symptoms. Fig. 1 shows symptoms on violas; any of these might occur with either disease.



Symptoms on violas and on pansies are much alike. The first symptom to develop after a plant is infected is a clearing of veins and veinlets on the youngest leaves (see fig. 1). This is hard to see; but if you hold one of these leaves up, you can see the light through these cleared veins. (A small magnifying glass helps.) The veins become clear first at the base of the leaf, then over the entire leaf. At a little later stage, you can see small round yellow spots on young leaves and yellow blotches on older ones. These blotches run together and spread all over the leaf. Leaves of pansies infected with celery-calico virus are sometimes yellow except for small green spots. The whole plant may be yellow in the late stages of either disease. Young

leaves may be dwarfed and misshapen. Young plants are stunted and finally die. On violas, even older plants may be stunted and have short, upright stems with thick, spear-shaped leaves.

## WHAT TO DO

Once a plant is infected, there is no way to cure it. You cannot reach the virus in the plant by sprays or other treatment. If you buy plants from a nursery, look them over carefully. If you see leaf symptoms or aphids on any of them, reject the whole basket or flat. Near-by flats are apt to be infected also, even though they may not yet show symptoms.

Aphids carry the disease from infected plants to healthy ones. Any kind of aphid that feeds on these plants may carry either disease to them; but the aphid must first have fed on some plant that already has the disease. The control for all species of aphids is the same.

Aphids multiply fast and may fly long distances. To control them, spray (or dust) *once a week*, except in the middle of summer. Any spray or dust that will kill aphids and not harm the plants may be used. Perhaps the simplest is:



Black Leaf 40 .....	3 teaspoons
Granulated soap .....	1 tablespoon
Water .....	1 gallon

First dissolve the soap in a small amount of hot water, then make up to a gallon with cold water and add the Black Leaf 40.

Spray the plants thoroughly, especially the undersides of the leaves. Lift up any parts of the plants that are lying on the ground or are close to it, and spray the lower surface. Spray near-by plants also; aphids on them may migrate later to pansies or violas. Some of them (such as delphinium) may even be infected with one of the viruses.



Pull out and destroy any diseased plants as soon as you see them. If you don't, aphids that have been missed in spraying or that fly in from other areas between sprayings may carry the disease to healthy plants.

Neither of these diseases is carried on or in the seed; nor can either be spread from one plant to another merely by contact. If you can keep your plants free of aphids, they will not become infected. One nurseryman eliminated the disease even from badly infected violas by spraying every week and destroying all plants that showed symptoms.

This circular is based on investigations which are reported in detail in *Hilgardia*, volume 17, number 18, also by Mr. Severin, is Entomologist in the Experiment Station.

Earlier and later stages of color breaking in yellow pansies.

